

The Rosenfeld Effect

International examples

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My Three Lessons from Art

1. Look for a handle on the problem:

The case of CFLs for the poor

2. Don't just sit there, do something!

UVWaterworks

3. Better to light a candle than curse the darkness:

Darfur cookstoves

Look for a handle on the problem

CFLs for the Poor in Developing Countries



Massive power shortages in the developing countries

Almost all developing countries have peak power shortages -- driven by residential lighting in the evening hours 6PM-10PM

Investments in the power sector (to meet peak shortages) compete with investments in other infrastructure: schools, roads, hospitals, etc

The bulk of residential lighting is in low income households, with incandescent lamps

Barriers to CFL use by the poor

Compact fluorescent lamps (CFLs), use 5 times less electricity, last 10 times longer, but also cost 10 times more

Poor consumers hugely discount future costs; and are very sensitive to first cost. So, prefer ordinary light bulbs

What is worse, the utilities routinely subsidize electricity for the poor, so subsidized electricity undercuts unsubsidized energy-efficiency

Get a handle on the problem by re-framing it

Recognize that utilities lose money by selling electricity to the poor-- so they should want to sell less!

Persuade them that if they transferred part of the subsidy to CFLs, they will sell less electricity and lose less money

Design a program to include the utility -- in its self interest -- to subsidize and promote CFLs through lease purchases and other means

Institutional innovation to bring it together

Bring to the table: the utility, CFL-manufacturers, researchers, public-interest groups. Make it work.

Take 1. Bombay Efficient Lighting Large-Scale Experiment (BELLE) 1989-91.
Failed.

Take 2. Mexico (IlluMex): Guadalajara and Monterrey. 1993-1997.
Success!

Take 3. Poland Efficient Lighting Project (PELP). 1995-1999.
Success!

Take 4. Argentina, Peru, the Philippines, South Africa, Hungary, Czech Republic, and Latvia (ELI). 1998-2003.
Success!

Don't just sit there, do something!

UVWaterworks



The Call to Action



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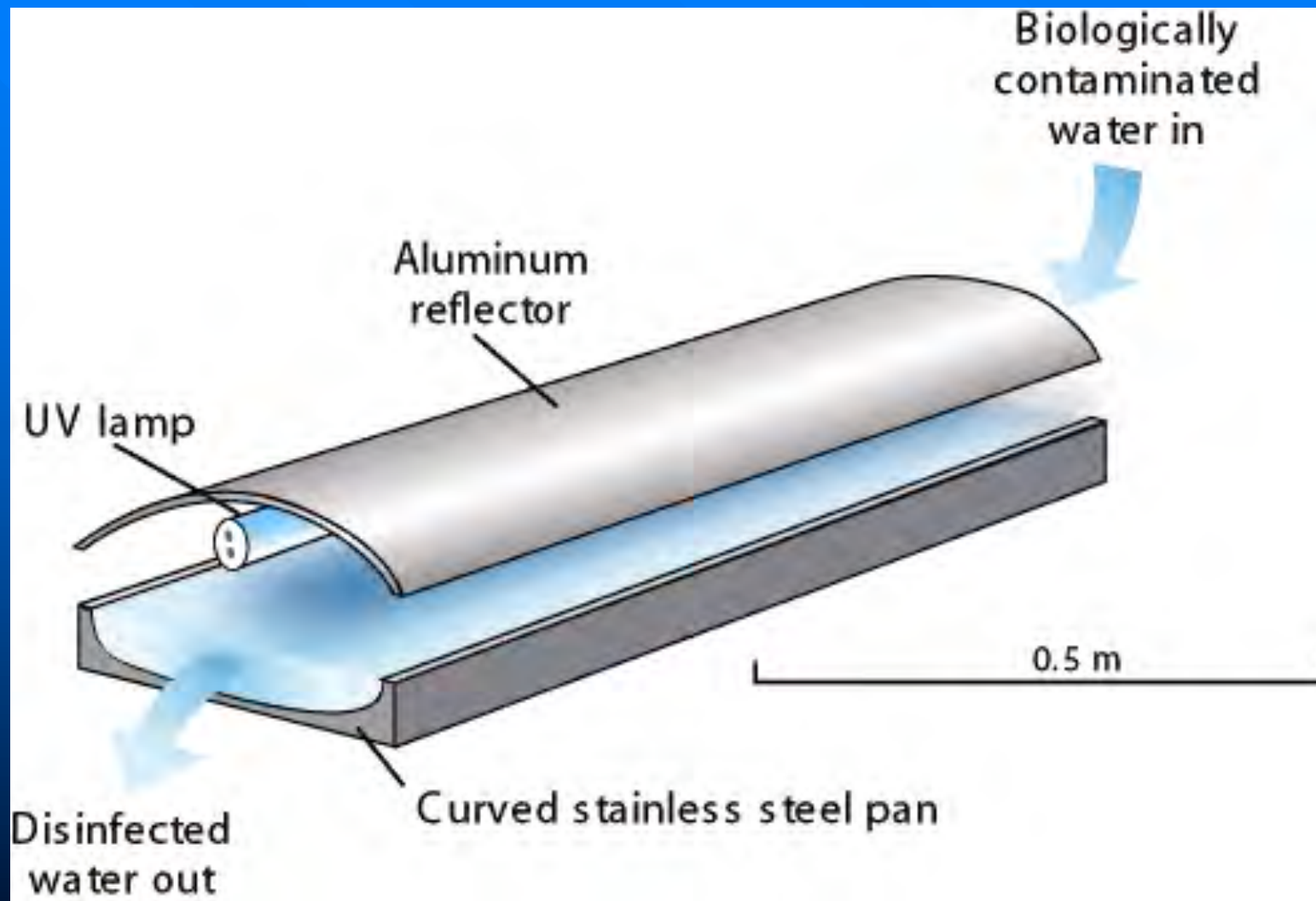
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A new water disinfecter for the developing world poor

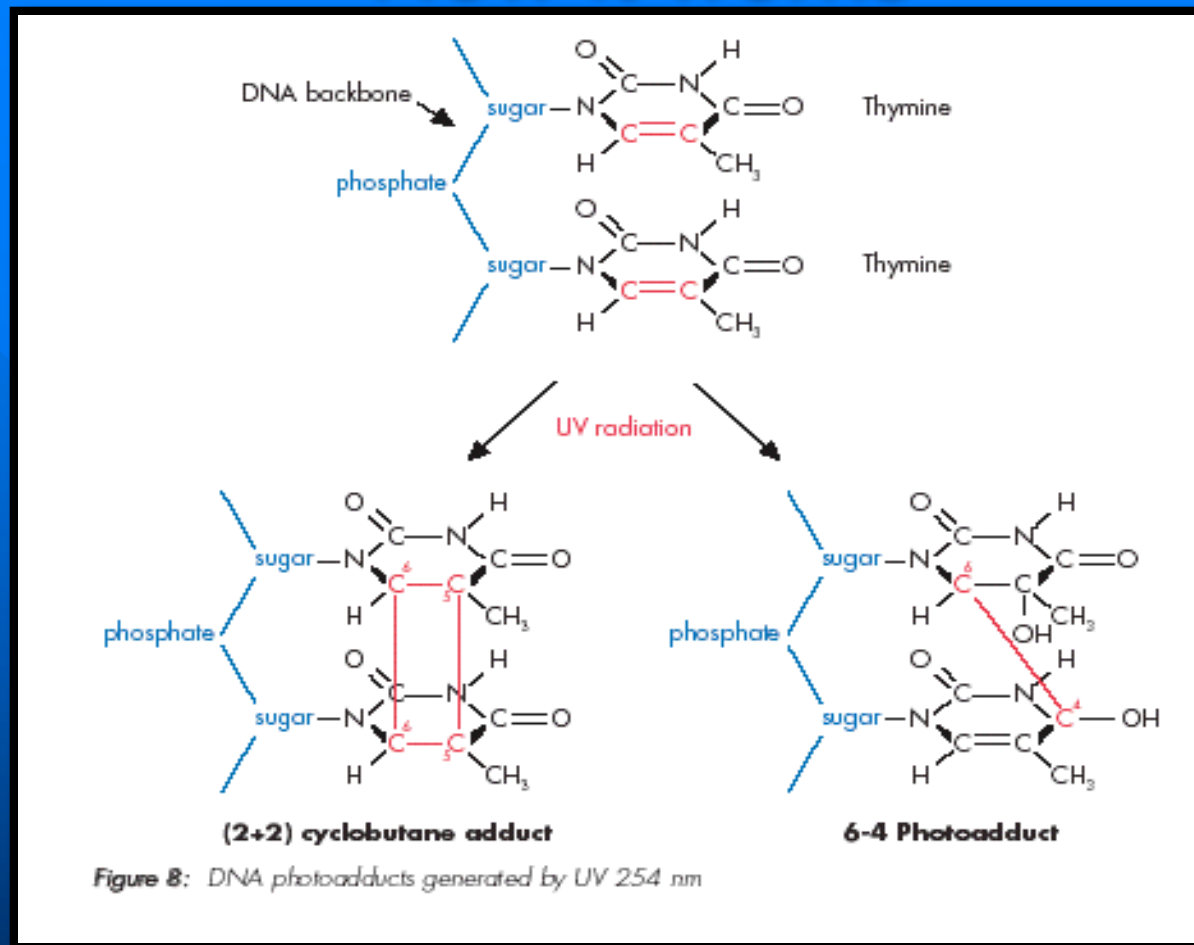
Design Criteria

- Meet / exceed WHO and US EPA criteria
- Energy efficient: 60 watts disinfects 1 ton / h
- Low cost: 4 cents disinfects a ton of water
- Reliable, Mature components
- Can treat unpressurized water
- Rapid throughput: 12 seconds
- Low maintenance: once every three months
- No overdose risk
- Fail-safe

UV-Waterworks design 1993-95



How it works



UV-C severely damages DNA and kills pathogens in water
Nominal dose to water = 120mJ/sq.cm of UV-C energy

From the lab to the wide world

- LBNL design was first tested in India (Uttar Pradesh), then modified and field tested again in South Africa (Kwazulu Nataal)
- Licensed in 1996 by UC/LBNL to a California start-up: WaterHealth International
- See:

www.waterhealth.com



UV Waterworks Unit



Length = 28 in.

Width = 15 in.

Height = 11 in.

Weight = 15 lb.



A UVW unit with
top cover off

Water kiosks for low-income urban communities



Manila, the
Philippines

1999





Resident collecting
drinking water,
San Ysidro Gallinero,
Mexico

April 2001

Installation in Andhra Pradesh, Krishna District. Dec. 2005



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Lakshmikumari, the Village PHC nurse with school children



Bomminampadu, Krishna District, Andhra Pradesh, India. 2005

15 liters of water sells for 1 Indian Rupee (= 2 cents U.S.) for full cost recovery

Local employment

“I am a new man... this project has changed my outlook on life.”

—Ch. Venakanna,
Bomminampadu CWS Operator



Better light a candle than curse the darkness:

Darfur cookstoves



Sudan and Darfur

SUDAN: largest country in Africa

Area = 2.5M km² (~1/4 of total U.S.)

Desert area = 93%

Population = 40 M

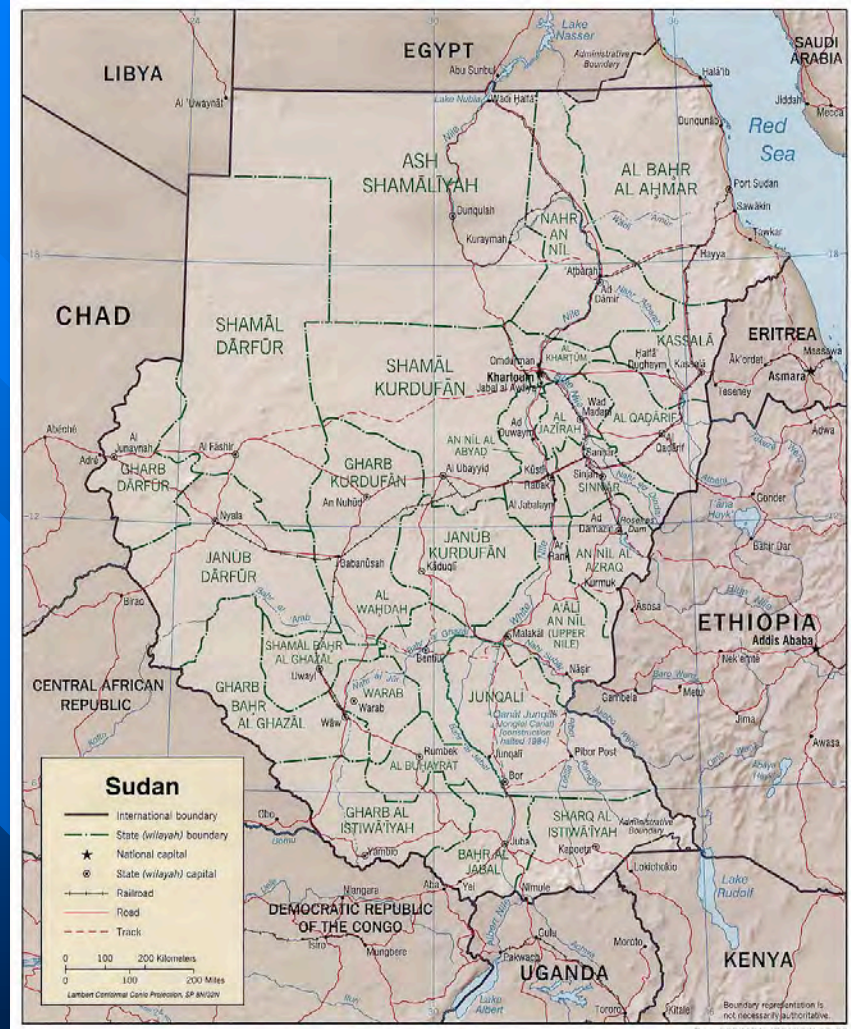
Per capita GDP = \$600

Pop. Below poverty line = 40%



History of Darfur Conflict

- Since 2003 in about 300,000 people have been killed in Darfur region of Sudan
- 2.2 million (mostly women and children) have been driven into crowded refugee camps



Darfur Refugee Camp



Nov 2005

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Darfur Situation

- In 2004, US State Dept called it “genocide”
- Refugees face severe shortage of fuel for cooking their food rations
- Ever-larger zone of denudation around the camps, as all vegetation is stripped for fuel

Plight of Darfur Women Refugees

Women and girls routinely risk rape and mutilation when they must leave the camps for gathering fuelwood. Typical trip lasts 7 hours.



Cookstoves

The refugees cook on simple three-stone fires.

Each family uses about US\$1 worth of fuelwood daily (it is traded because some women sell part of their food rations to get cash to buy fuelwood).



Efficient metal cookstoves

In Nov.-Dec. 2005, we visited Darfur camps, and showed that with a \$10 metal stove, and training to use it, only half the fuelwood is needed.

The stove saves fuelwood worth \$160 annually for a refugee family



Side by side testing of stoves in Darfur camps



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Recent stove improvements: Spring 2006

UC Berkeley students currently working with me have about doubled the metal stove performance, so it now needs only about 25% fuelwood compared to three-stone fire.

CHF International, the U.S. non-profit with whom we worked in Darfur, is eager and funded to make and disseminate stoves of this design.

Making a difference in Darfur

300,000 stoves are needed for 2.2 M refugees

Funding is needed to Berkeley to

- complete design

- field test stoves in Darfur

- help CHF Sudan order production equipment

- train Darfur locals in stove production

- and assist with dissemination

<http://darfurstoves.lbl.gov>

The background of the slide features a blue gradient that transitions from a lighter blue at the top to a darker blue at the bottom. Overlaid on this gradient are several diagonal stripes of varying shades of blue, creating a sense of depth and movement.

Questions?

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